Amendments to the Specification

Please **add** the following **new** paragraph at page 1, line 2:

This application claims the benefit, under 35 U.S.C. § 365 of International Application PCT/EP04/012593, filed November 6, 2004, which was published in accordance with PCT Article 21(2) on July 28, 2005 in English and which claims the benefit of European patent application No. 04000258.6, filed January 8, 2004.

Please **add** the following **new** paragraph after the paragraph ending at page 2, line 4:

US 2002/0176332 discloses an aberration detection device for an optical disk player. A returning light beam emitted by a light source and reflected by an optical disk is separated by a half mirror, and partitioned and deflected at a hologram into a light beam passing a first region and a light beam passing a second region. The light beam passing the first region is received by a plurality of photo-detectors, and the aberration is detected by comparing the resulting signals.

Please **replace** the paragraph beginning at page 2, line 6 with the following **amended** paragraph:

It is an object of the invention to propose ~~a further method~~ an alternative solution for determining spherical aberration in a light beam.

Please **replace** the paragraph beginning at page 2, line 9 with the following **amended** paragraph:

According to the invention, this object is achieved by a method including the steps of:
- splitting the light beam into at least two partial light beams with a volume hologram having stored wavefront patterns with various degrees of spherical aberration;
- focusing the partial light beams onto respective detectors, whereby at least one signal generated by the detectors depends on the positions of the respective partial light beam; and
- determining the spherical aberration using the signals generated by the detectors.
According to the invention the wavefront of the incoming light beam is compared with the plurality of stored wavefronts. The splitting of the light beam into a plurality

of partial light beams then depends on the grade of similarity of the wavefront of the incoming light beam with one of more of the stored wavefronts. The splitting of the light beam into partial light beams is performed such that the position of at least one of the partial light beams depends on the amount of spherical aberration of the light beam. Therefore, by determining the position of this partial light beam, the spherical aberration is measured. Preferably, only a small part of the light beam is directed onto the detectors for measuring the spherical aberration, while the main part is used for focusing and tracking and for reading the data from the optical recording medium.

Please **delete** the paragraphs beginning at page 2, line 28 and ending at page 3, line 35.

Please **replace** the paragraph beginning at page 4, line 1 with the following **amended** paragraph:

According to ~~a further aspect of the invention, a hologram is provided for splitting the light beam into the partial light beams. The hologram can, for example, direct parts of the outer part of the light beam onto the respective detectors. Alternatively, a plurality of wavefront patterns are stored in the hologram. In this way the wavefront of the incoming light beam is compared with the plurality of stored wavefronts. The splitting of the light beam into a plurality of partial light beams then depends on the grade of similarity of the wavefront of the incoming light beam with one of more of the stored wavefronts.~~another aspect of the invention, the object of the invention is also achieved by a device for determining spherical aberration in a light beam, including:
- a volume hologram having stored wavefront patterns with various degrees of spherical aberration for splitting the light beam into at least two partial light beams;
- focusing means for focusing the partial light beams onto respective detectors; and
- a signal processor for determining the spherical aberration using the signals generated by the detectors.

Please **delete** the paragraphs beginning at page 4, line 26 and ending at page 4, line 35.

Please **replace** the paragraph beginning at page 5, line 16 with the following **amended** paragraph:

For a better understanding of the invention, an exemplary embodiment is specified in the following description with reference to the figures. It is understood that the invention is not limited to this exemplary embodiment and that specified features can also expediently be combined and/or modified without departing from the scope of the present invention. In the figures:

Fig. 1 shows the phase distribution of the returning light beam when spherical aberration is present;

Fig. 2 shows an optical pickup ~~according to the invention~~ capable of measuring spherical aberration;

Fig. 3 depicts in more detail a special beam splitter ~~according to the invention~~;

Fig. 4 shows the normalized difference signal SA as a function of the thickness of the cover layer,;

Fig. 5 depicts the normalized difference signal SA as a function of the focal length of a liquid-crystal lens used for aberration correction; and

Fig. 6 depicts an optical pickup according to ~~a further aspect of~~ the invention capable of measuring spherical aberration.

Please **replace** the paragraph beginning at page 9, line 4 with the following **amended** paragraph:

~~A further~~ An approach according to the invention for measuring the spherical aberration is shown in Fig. 6. In this embodiment the special beam splitter is replaced by a special volume hologram 15. Furthermore, instead of two additional detectors three additional detectors 16,17,18 are used, generating the signals A, B and C, respectively. It is well known that volume holograms can be used to correlate wavefronts with stored patterns. By storing wavefront patterns with various degrees of spherical aberration, it is possible to determine the amount of spherical aberration of an impinging wavefront. The hologram is preferably designed as follows. Most of the light (>90%) is transmitted through the hologram. If the wavefront passing through the hologram 15 has a positive spherical aberration, 1-2% of the light are focused on the first detector 16. If the wavefront passing through the hologram 15 has no spherical aberration, 1-2% of the light are focused on the second detector 17. If the wavefront passing through the hologram 15 has a negative spherical aberration, 1-2% of the light are focused on the third detector 18. By comparing the signals A, B, C of the three detectors 16, 17, 18 with a suitable algorithm a control signal for a spherical aberration corrector is generated. Favourably, the hologram 15 is located directly on the focusing lens 6. This has the advantage that the hologram 15 always remains well adjusted even if the focusing lens 6 is actuated for focusing or tracking. The main difficulty for this technique is the initial design of the hologram 15. Once the design is done the volume hologram 15 can easily be mass produced by replication in plastic.